

Mark: $\frac{19}{25}$

Electrical Measurements

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Q1 The persistence: The time required for the emitting light to decay to a certain value, usually 10% of the original light output. ~~From the~~
 The luminance: The intensity of the light emitted from the CRT Screen.

Q2
$$f = \frac{1}{2\pi\sqrt{C_1 C_3 R_1 R_3}} = \frac{1}{2\pi\sqrt{0.4 \times 10^{-6} \times 0.4 \times 10^{-6} \times 2 \times 10^3 \times 2 \times 10^3}}$$

$$= \frac{1}{2\pi\sqrt{0.64 \times 10^{-6}}} = \frac{1}{2\pi(8 \times 10^{-4})}$$

~~198.9 Hz~~
$$= 5.026 \times 10^3 = 198.9 \text{ Hz}$$

$$\frac{R_2}{R_4} = \frac{R_1}{R_3} + \frac{C_3}{C_1}$$

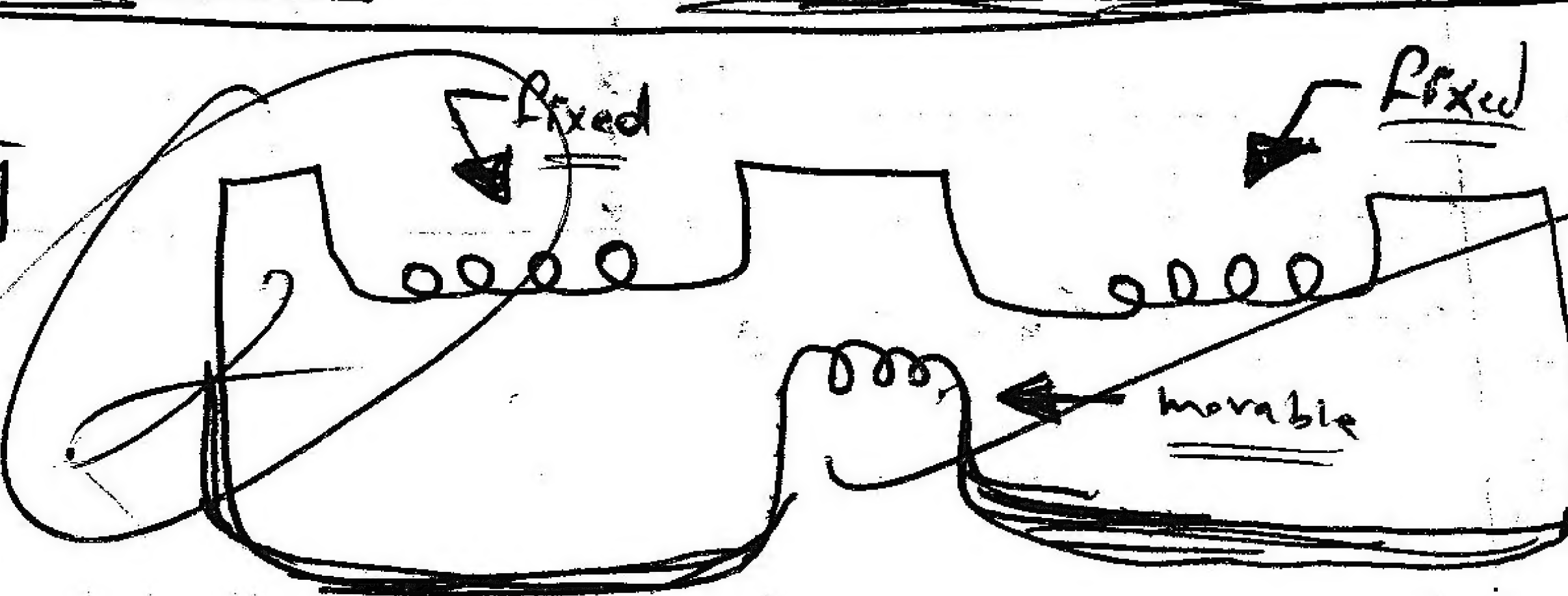
$$\frac{10 \times 10^3}{R_4} = \frac{2 \times 10^3}{2 \times 10^3} + \frac{0.4 \times 10^{-6}}{0.4 \times 10^{-6}} = 1 + 1 = 2$$

$$\Rightarrow \frac{10 \times 10^3}{R_4} = 2 \Rightarrow R_4 = \frac{10 \times 10^3}{2} = 5 \times 10^3 = 5 \text{ k}\Omega$$

Wien Bridge
 ① Frequency
 ② R_4

Q3

سؤال عن
 electro dynamometer
 مولد وكاشف



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3.5

Q4 The basic Principle of operation: is to generate under measurement current in order to produce magnetic field flux (produced from the movement of movable part).

C ~~Q3~~ ~~Q4~~

$$D \propto i^2$$

$$I \uparrow \rightarrow D \uparrow$$

If the current increases the deflection in the electrodynamometer will be increased automatically

$$D = \sqrt{\frac{1}{T} \int_0^T i^2 dt}$$

~~$$D \propto i^2$$~~

$$D \propto i^2$$

Q4 b $\theta = 180^\circ$

a $\sin \theta = \frac{4}{5}$

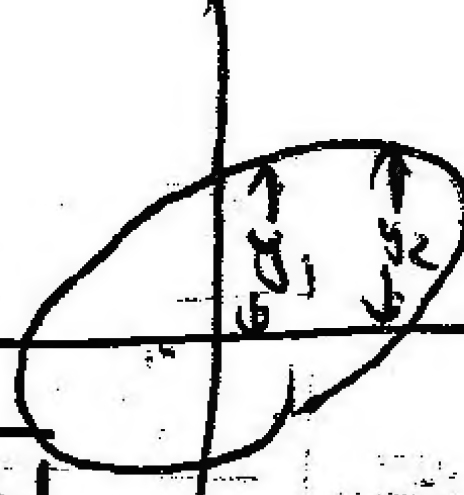
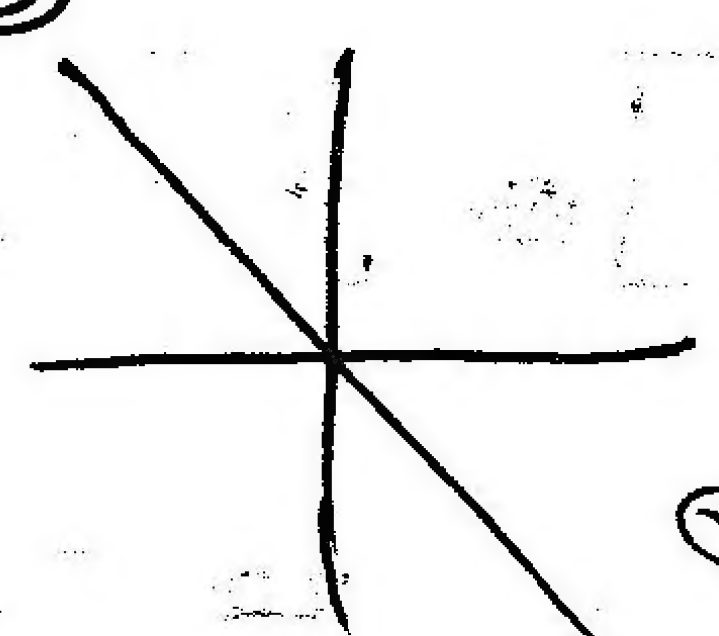
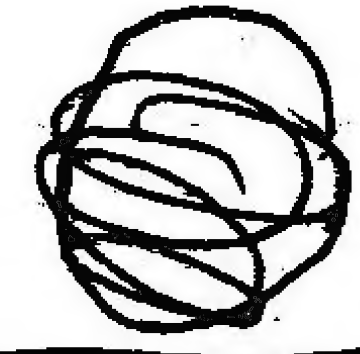
$$\sin \theta = \frac{2}{2.5}$$

$$\therefore \sin \theta = 0.8$$

$$\theta = \sin^{-1}(0.8) = 53.1^\circ$$

سوال عن

Lassq jons
figures



Q5

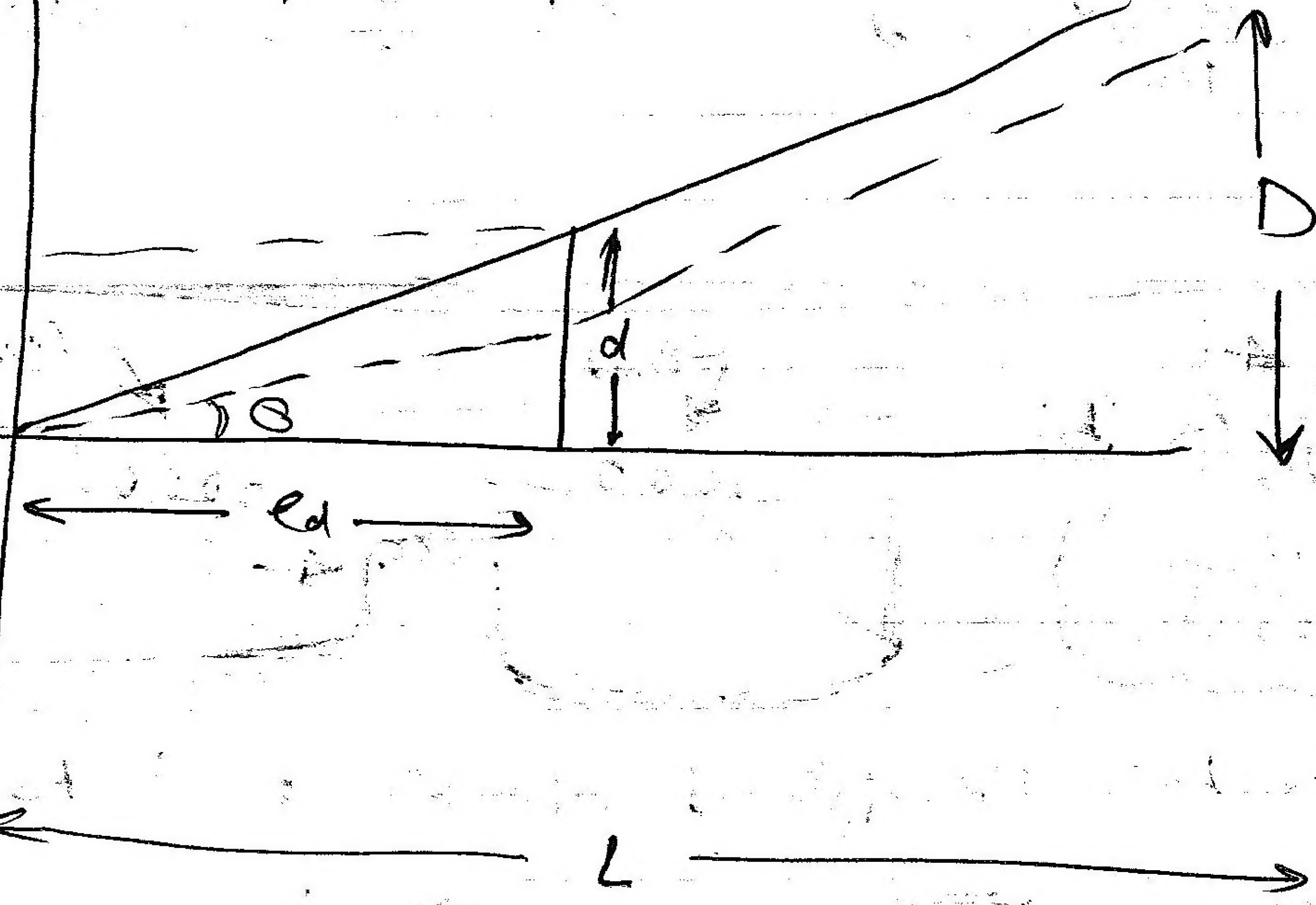
$$D = \frac{L \rho d E_d}{2d E_g}$$

Deflection

سوال با ب
ریت الف و ب

$$D = \frac{L \rho d E_d}{2d E_g}$$

مع رسم



$$\bullet F = ma_y$$

$$\bullet a_y = \frac{F}{m} = \frac{e E_y}{m}$$

$$\bullet V_y = \frac{e E_y}{m} t$$

$$\bullet V = V_0 + a t$$

$$\bullet X = X_0 + V_0 t + \frac{1}{2} a t^2$$

$$D = \cancel{\frac{L d E_d}{2 V_0^2 X}}$$

$$\Rightarrow \frac{L d E_d}{2 d E_a}$$

$$\bullet 2 V_0^2 X = 2 d E_a$$

$$S = \frac{D}{E_d} = \frac{L d \cancel{E_d}}{2 d E_a}$$

$$G = \frac{1}{S} = \frac{2 d E_a}{L d}$$

There is a relationship between Newton's Laws and the deflection of electron beam between plates in the CRT Screen

Finished
تم بحمد الله